

REVIEWS

Spalding's Distribution and Movements of Desert Plants*

The author has divided his problem into seven divisions, under as many headings. Five of these appertain to various phases of his problem, the last two are mainly recapitulative.

Tumamoc Hill and its environs, near the desert botanical laboratory, Tucson, Arizona, was the place chosen where "prolonged observational and experimental work could be undertaken." The first section of the paper (pp. 5-27. *pl. 1-12*) is taken up with a clear and logical account of the plant associations and habitats as they have appealed to the author. Appended to this is an account of the lichens of the region, written by Dr. Bruce Fink.

Leaving the section on plant associations and habitats which, though valuable, is necessarily becoming more and more stereotypic in each succeeding ecological paper, we come to the most interesting part of the whole work. In this second chapter (pp. 29-66. *pl. 13-24*), the author gives an account of the local distribution. He writes: "Dealing more in detail with constituent species of the associations, the attempt to trace cause and effect is carried a step farther. Certain species have been carefully mapped and their habits have been more thoroughly studied with reference to differences of soil and aspect."

The species selected for this study are plants "with a remarkable definiteness of habitat preference"; they are *Encelia farinosa*, *Larrea tridentata*, *Cereus* (why not *Carnegiea*?) *giganteus*, *Cercidium Torreyanum*, and *Prosopis velutina*. A distribution-map for each of these species is included, and they form a series of invaluable notes. Each map is practically a graphic census of the individuals of the species under discussion. Nothing could have been found to indicate so well the relative density of these plants. The various soil formations are critically studied, and following as they do the various distribution-maps mentioned above, they are at least a suggestion of the factors the author credits with the

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control of the distribution of these plants. Other regulative factors, such as temperature, rainfall, humidity, etc., all carefully measured, come in for their share of attention.

Still under the general heading of local distribution are sections devoted to dispersal, invasion, competition, and succession, in which the author attempts to trace some of the other factors bearing on the distribution of the plants in the area studied. A section on the root system of *Cereus giganteus* is here introduced by Dr. W. A. Cannon.

Space forbids an account of the chapter on environmental and historical factors. There are included within it sections on the geology and soils of the region written by C. F. Tolman and B. E. Livingston respectively.

Chapter four is taken up with the vegetation groups of the desert laboratory domain and is contributed by Professor J. J. Thornber. It contains lists of the plants growing on the various major formations found in the area, and also considerable statistical matter.

The chapter on the origin of desert floras is contributed by Dr. D. T. MacDougal. This brings into co-relation much of what has been treated specifically in earlier parts of the work. Some of this section has already seen the light in the *Plant World* for September, 1908.

Dr. Spalding has collected and put on permanent record a mass of very interesting and essential facts dealing with the subject in hand. Throughout there is a creditable hesitancy in drawing conclusions, some of which might have been warranted in view of the wealth of detail. The statistical and graphic part of the work is splendid; and work like this and that done by Jennings and others will undoubtedly serve as the bases of numerous ecologic palimpsests.

The illustrations and typography are all that could be desired.

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